1981 Beech Scale/Beech Bark Disease Survey on the Greenbrier Ranger District Monongahela National Forest, West Virginia

by

Manfred E. Mielke
and
Frank Kenney

ABSTRACT

Beech scale was found infesting American Beech on 70,000 acres of National Forest land in Randolph and Pocahontas Counties, WV. Nectria galligena was found in association with beech scale in a limited area within the infestation. N. coccinea var. faginata was not observed. This is the first reported occurrence of beech scale together with N. galligena on American beech in West Virginia.

INTRODUCTION

This survey was prompted by the initial discovery of beech scale (Cryptococcus fagisuga Lind.) by Forest Pest Management, West Virginia University, and West Virginia Department of Agriculture personnel in August 1981. Beech scale was found on numerous American beech (Fagus grandifolia Ehrh.) in the Gaudineer Scenic Area, Greenbrier District, Monongahela National Forest. This was the first report of beech scale in West Virginia. The previous known range of beech scale was south to the Maryland and Delaware borders and west to central Pennsylvania.[a]

Beech bark disease is caused by Nectria coccinea var. faginata Lohm. et. al., in association with the beech scale. Beech scales are of little direct consequence to the tree, however, their feeding subsequently kills and exposes the cambium at the feeding site providing N. coccinea var. faginata an ideal point for infection. This infection progresses within the tree, killing the cambium, ultimately girdling the tree and killing it. Fruiting occurs as bright red perithecia or white sporodochia in depressed cankered areas with the dead bark tightly appressed to the stem.

A source of confusion exists since another macroscopically identical species of Nectria, N. galligena Bres., is frequently also associated with beech scale. N. galligena is not as virulent nor as damaging to beech as is N. coccinea var. faginata. The relationship between N. galligena and N. coccinea var. faginata in the beech bark disease complex is unknown. It has been observed that N. coccinea var. faginata follows infestations of beech scale by 3 to 6 years.

(a) Personal communication with Dr. Barry Towers, Plant Pathologist, Pennsylvania Department of Environmental Resources, Middletown, PA.

OBJECTIVES

The objectives of the survey were to determine the extent of beech scale infestation and to determine if beech bark disease was also present.

PROCEDURE

Using Monongahela National Forest and 7.5 minute topographic quadrangle maps as a guide, we drove roads in and around the Gaudineer Scenic Area, stopping at 1 to 5 mile intervals, or whenever we came into beech type. At these sample points, beech trees on either side of the road were examined. No attempt was made to quantify the level of beech scale infestation on individual trees, although we did observe very light to extremely dense populations. If beech scale was present, trees were further inspected for any signs of *Nectria sp*; and then we proceeded to the next sample point. If no beech scale was present, we walked a transect line of five chains examining beech trees 1/2 chain on either side of the transect line. This provided for a maximum of 1/2 acre of forest examined per sample point. Any signs of *Nectria sp*. were collected for later identification.

RESULTS AND DISCUSSION

Of the 41 sample points established, 24 had no evidence of beech scale or beech bark disease, 14 had some level of beech scale and 3 had both beech scale and a species of *Nectria* later identified as the less-virulent species, *N. galligena* (Figure 1). The identification is based on length measurements of 25 ascospores $\bar{x}$ = 16.43 um, s = 1.38 um.(1)

The area infested with beech scale comprised approximately 70,000 acres, mostly north of Route 250 on Cheat, Shavers and Middle Mountains. *Nectria galligena* was found on Shavers Mountain within a 3-mile stretch of road north of the Gaudineer Scenic Area. This area is located in parts of Randolph and Pocahontas Counties, WV (Figure 2).

The observed extent and level of infestation indicates that beech scale has been present in West Virginia for several years. Shavers Mountain is in the center of the infested area, and sample points established on the mountain indicate a more continuous infestation. The presence of *N. galligena* in association with beech scale on Shavers Mountain supports the contention that this area could have served as the point of establishment of this infestation. *N. galligena* has been widely reported in the mountain region of West Virginia on black walnut (*Juglans nigra* L.) and other hardwoods(2), both in Randolph and Pocahontas Counties, however, our success in finding *N. galligena* associated with beech scale only in a very limited area on Shavers Mountain suggests that the infestation has existed there longer, enabling the association to develop.

The primary means of long range insect dispersal is wind dispersal of the nymphal stage although other means such as physical transport are certainly possible. The spread and intensity of localized infestation of beech scale is mainly influenced by wind, moisture and temperature.

If the observed pattern of scale infestation followed in 3 to 6 years by beech bark disease holds true, we can expect N. coccinea var. faginata to occur in this area within the next few years.

Since this type of survey is limited by road access, land ownerships, and time, the full extent of the infestation may not have been mapped. The dynamics of beech scale may also provide for its occurrence elsewhere in the State, possibly throughout the entire range of American beech.

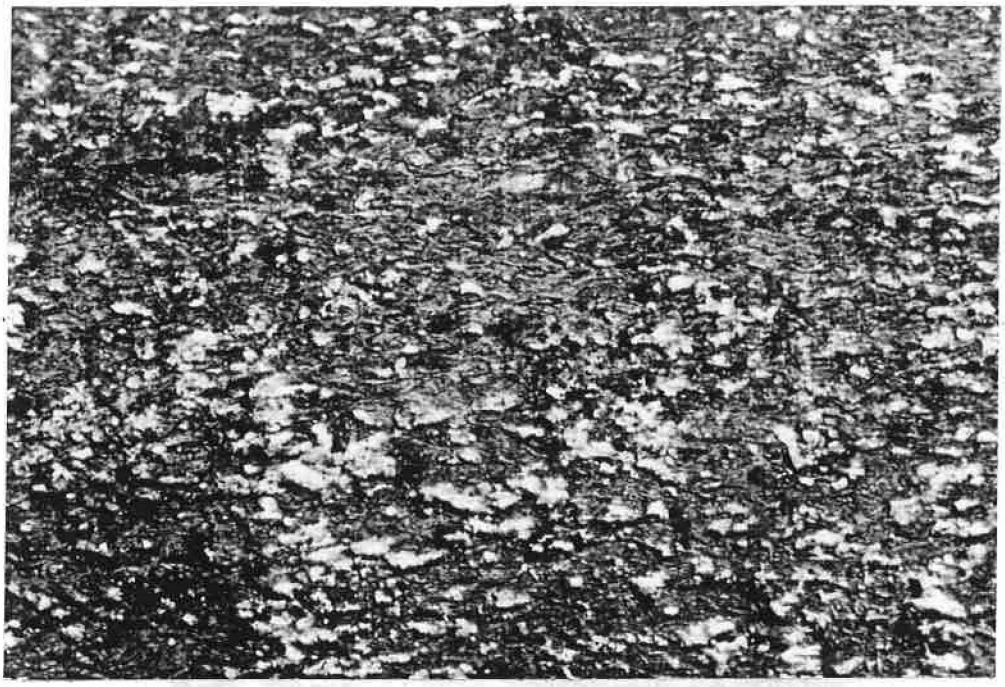
Based on the results of this survey, we offer the following alternative actions:

1) Do nothing. This would result in the continued unmonitored existence of beech scale, possibly leading to the occurrence of beech bark disease and resultant mortality. There is no practical solution to reducing levels of beech scale.

2) Include beech scale and Nectria observations as a normal part of timber management activities. This will improve information on the occurrence and dynamics of the beech scale and also provide the opportunity to deal with beech bark disease if it should appear.

3) Discriminate against Nectria sp. infected beech when harvesting or conducting timber stand improvements. Although N. galligena is not as potentially destructive as N. coccinea var. faginata, it will weaken trees and cause breakage and mortality. At the very least, infected trees will serve as sources of inoculum for surrounding beech trees which become infested by scale.

4) Use a combination of alternatives 2 and 3 together with observations by Forest Service Research personnel in selected areas. The observations would be part of a current study of beech bark disease being conducted by NE Forest Experiment Station in Hamden, CT. This will lead to improved techniques for long-term management by increasing knowledge of the interactions and interelationship between beech scale, N. galligena and N. coccinea var. faginata and the American beech.



Beech Scale

Nectria galligena On
Beech Scale Infested Trees

Figure 1 (con't.)

Cambial Death Caused by
N. galligena Associated With
Beech Scale

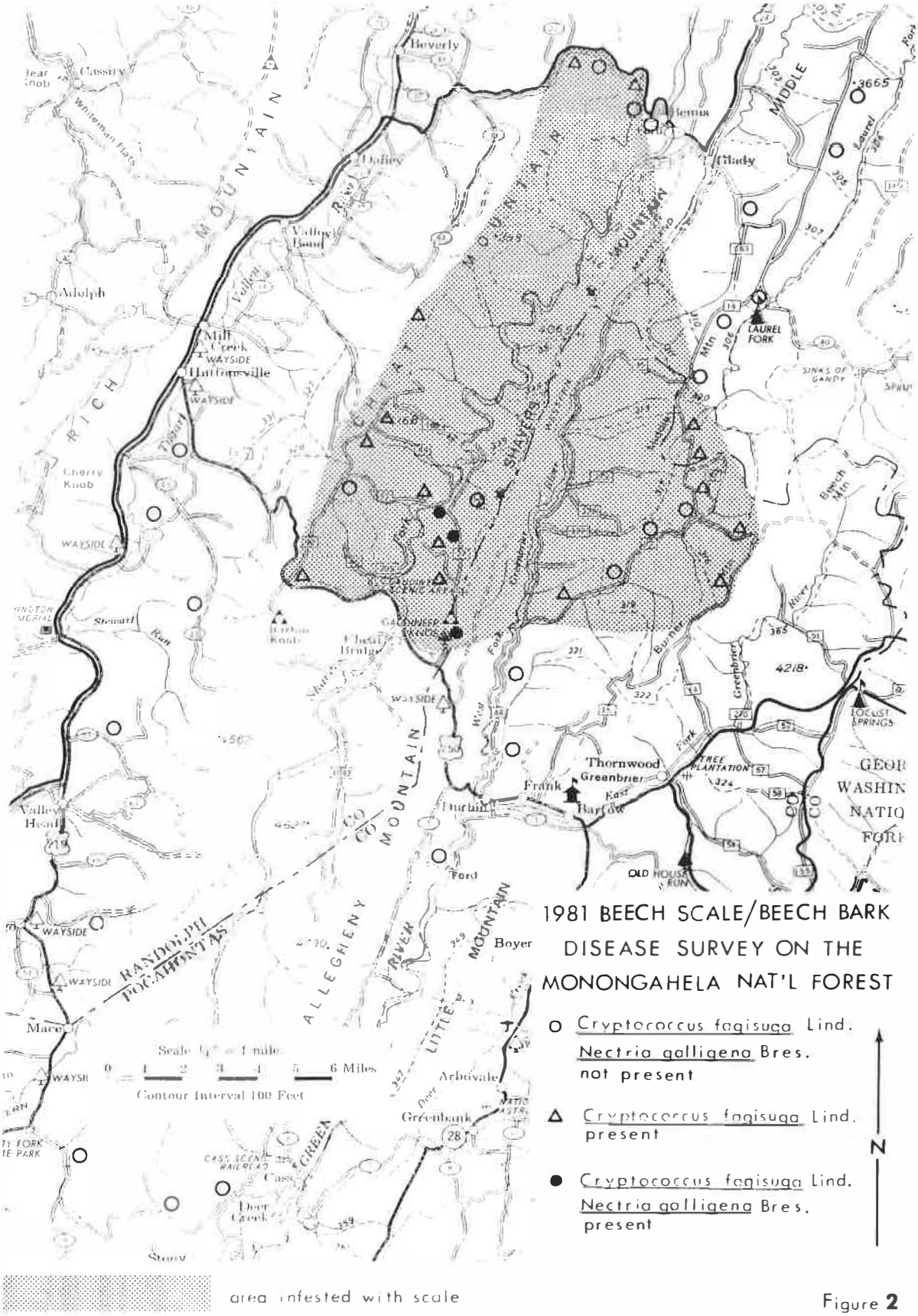

1981 BEECH SCALE/BEECH BARK DISEASE SURVEY ON THE MONONGAHELA NAT'L FOREST
o Cryptococcus fagisuga Lind. Nectria galligena Bres. not present
△ Cryptococcus fagisuga Lind. present
● Cryptococcus fagisuga Lind. Nectria galligena Bres. present
N
area infested with scale
Scale 1" = 1 mile
0 1 2 3 4 5 6 Miles
Contour Interval 100 Feet
RICH MOUNTAIN
SHAVERS MOUNTAIN
ALLEGHENY MOUNTAIN
RANDOLPH
POCAHONTAS
Beverly
Cassity
Valley Bend
Adolph
Mill Creek
Huttonsville
WAYSIDE
Cherry Knob
Valley Head
Durbin
Thornwood
Greenbrier East
Frank
Bartow
Ford
Boyer
Arbovale
Greenbank
Glady
LAUREL FORK
LOCUST SPRINGS
OLD HOUSE RUN
TREE PLANTATION
Dogway
Middle
Laurel
Stuart
Run
Shavers
Fork
Burner
Greenbrier
Little
River
Deer
Creek
Stony
3665
4218
28

Figure **2**

LITERATURE CITED

1. Cotter, H.V.T. and Blanchard, R.O. 1981 Identification of the Two Nectria taxa Causing Bole Cankers on American Beech. Plant Disease: 65: 332-334.

2. Ashcroft, J.M., 1934. European Canker of Black Walnut and Other Trees. WV Agricultural Experiment Station Bulletin 201. 52 pp.

United States Department of Agriculture | Forest Service | NA | MFO

Reply to: 1380 Reports

Date: October 29, 1981

Subject: Beech Scale/Beech Bark Disease Survey

To: Supervisor, Monongahela NF

Enclosed is the beech scale/beech bark disease survey evaluation report conducted by FPM. We hope it will be useful in the management of affected areas.

As you know, we will be involved in training national forest personnel in the recognition of these and other forest pests in the upcoming months. If these or other pest problems become apparent, we would like to be made aware of them. We will gladly assist in performing future evaluation of a similar nature.

Allan T. Bullard

ALLAN T. BULLARD
Field Representative
Forest Pest Management

MEM/gjc